UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,401	10/20/2003	Benjamin Jay Diament	060963-0015US	5943

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ART UNIT .	PAPER NUMBER
2162	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/690,401	DIAMENT, BENJAMIN JAY
	Examiner	Art Unit	
	Cam Y T. Truong	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE **3** MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6,13,15-18,25,27-30 and 37-48* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,13,15-18,25,27-30 and 37-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some *　c)☐ None of:

　　　　1.☐ Certified copies of the priority documents have been received.

　　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1. Applicant has amended claim 25 in the amendment filed on 12/10/2007.

Claims 1, 3-6, 13, 15-18, 25, 27-30 and 37-48 are pending in this Office

Action.

Response to Arguments

2. Applicant's arguments filed 12/10/2007 have been fully considered but

they are not persuasive.

a. Applicant argued that the combination of Matsuda and Burrows does not

teach "a logarithm of the boundary number".

In response's to applicant's argument, examiner respectfully disagrees. Matsuda

teaches a boundary number such as number 10 (paragraph 0047). Burrows teaches

Burrows teaches [0319] The number of levels needed to encode a range of N integers,

with doubling of sizes, is a function of log.sub.2 N, where N is the number of

possible range-based integer values to be encoded.

Thus, the combination of Matsuda and Burrows teaches the above claimed

limitation.

b. Applicant argued that Burrows nor Matsuda teaches the calculation of a

logarithm as an intrinsic part of search process.

In response to applicant's argument, this claimed limitation is not recited in claims.

c. Applicant argued that claims 25-30, 46-48 are statutory.

However, as regarding claims 25-30 and 46-48, "a search engine for querying

number-range searches", the claims are related to descriptive material that can be

characterized as either "functional descriptive material" or "nonfunctional descriptive

material." Both types of "descriptive material" are nonstatutory when claimed as

descriptive material *per se*, 33 F.3d at 1360, 31 USPQ2d at 1759. When <u>functional</u>

descriptive material is recorded on some computer-readable medium, it becomes

structurally and functionally interrelated to the medium and will be statutory in most

cases since use of technology permits the function of the descriptive material to be

realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed.

Cir. 1994).

Claim Rejections - 35 USC § 101

3.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or
> composition of matter, or any new and useful improvement thereof, may obtain a patent
> therefor, subject to the conditions and requirements of this title.

4.   Claims 25-30 and 46-48 are rejected under 35 U.S.C.101 because the claimed

invention is directed to non-statutory subject matter, specifically, as directed to an

abstract idea.

As regarding claims 25-30 and 46-48, "a search engine for querying number-range

searches", The claims lack the necessary physical articles or objects to constitute a

machine or a manufacture within the meaning of 35 USC 101. They are clearly not a

series of steps or acts to be a process nor are they a combination of chemical

compounds to be a composition of matter. As such, they fail to fall within a statutory

category. They are, at best, functional descriptive material *per se*.

Descriptive material can be characterized as either "functional descriptive material" or

"nonfunctional descriptive material." Both types of "descriptive material" are nonstatu-

tory when claimed as descriptive material *per se*, 33 F.3d at 1360, 31 USPQ2d at 1759.

When <u>functional</u> descriptive material is recorded on some computer-readable medium, it

becomes structurally and functionally interrelated to the medium and will be statutory in

most cases since use of technology permits the function of the descriptive material to be

realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed.

Cir. 1994)

Merely claiming <u>non</u>functional descriptive material, i.e., abstract ideas, stored on a

computer-readable medium, in a computer, or on an electromagnetic carrier signal,

does not make it statutory. See *Diehr*, 450 U.S. at 185-86, 209 USPQ at 8 (noting that

the claims for an algorithm in *Benson* were unpatentable as abstract ideas because

"[t]he sole practical application of the algorithm was in connection with the programming

of a general purpose computer.").

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102
of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject
matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art
to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was
made.

6. Claims 1, 3-4, 6, 13, 15, 16, 18, 25, 27-28, 30, 38, 40, 42, 44, 46, 48 are rejected

under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in

view of Burrows (US 20040243569).

As to claims 1 and 13, Matsuda teaches the claimed limitations:

"receiving a number-range search query having a number range, wherein the

number range includes a boundary number" as processing a query have a condition

of price >10. 10 is represented as one boundary number (paragraph [0047]);

"generating an expression of numerical index terms based on the boundary

number" as transforming query to an equivalence search using an inverted index

generated, e.g., the exemplary query is simple query having a single search

condition. For two numbers N and M, their tokens Ni and Mi, if N.M there exists, by

definition, a token Nj which is greater than Mj. In this case, the transformed query

has an index entry that includes attribute, token, list). The transformed query is

based on number 10 (paragraph [0047, 0048, 0049], page 4, col. Right, lines 49-52),

"wherein at least one numerical index term includes information associated with

an indexed number" as each index entry includes each token associated with an

indexed number, e.g., token 0001 is associated with index 5 (page 4, col. Right, lines 49-52; fig. 5);

"searching a document index using the expression to identify one or more document containing indexed numbered that satisfy the expression" as returning to the search condition, document Ids are retrieved from each matching token index which results in an ID list of all documents that match those tokens (paragraph [0052]);

"returning a result in accordance with at least a subset of the identified documents" as (paragraph 0052, page 20, col. Right).

"wherein a respective numerical index term in the expression includes information indicative of an integral portion" as index term 01, 001, 0001 in table 1 includes a 1 bit in certain positions of the binary number indicates only numeric values that are greater than 10 (paragraphs 0051, 0047, 0048)

Matsuda does not explicitly teach the claimed limitation "of a logarithm of the boundary number".

Burrows teaches [0319] The number of levels needed to encode a range of N integers, with doubling of sizes, is a function of log.sub.2 N, where N is the number of possible range-based integer values to be encoded.

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Burrows' s teaching to Matsuda's system in order to process a query having multiple ranges more efficiently and further eliminate

processing time by eliminating unnecessary physical accesses of the data while

executing of the query and further order to identify locations of the records including

portions of numeric information within the span of the range of values.

As to claims 3, 15, 27, Matsuda teaches the claimed limitation "wherein at least

one numerical index term in the expression includes information indicating that a

specified digit is the last non-zero digit of a respective number" as (fig. 5, page 4,

col. Right, lines 49-52, paragraph [0042]).

As to claims 4, 16, 28, Matsuda teaches the claimed limitation "wherein at least

one numerical index term in the expression includes information indicative of the

sign of a respective number" as (fig. 5, page 4, col. Right, lines 49-52, paragraph

[0042]).

As to claims 6, 18 and 30, Matsuda does not explicitly teach the claimed

limitation "wherein the expression includes a plurality of numerical index terms that

each correspond to a single respective digit of a respective number". Burrows

teaches index terms that corresponding to a digit of a range number (fig. 7, col. 26,

lines 1-30).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Burrows's teaching of index terms that

corresponding to a digit of a range number to Matsuda's system in order to identify

locations of the records including portions of numeric information within the span of

the range of values.

As to claim 25, Matsuda teaches the claimed limitations:

"one or more servers, each having one or more processors and memory, the one

or more servers including" as (paragraph 0021, 0023): "a query-encoder configured to

receive a number-range search query having a boundary number," as processing a

query have a condition of price >10. 10 is represented as one boundary number. The

above information indicates that the system has included a query-encoder to receive the

query and process the query (paragraph [0047]);

"wherein the query encoder is configured to generate an expression of numerical

index terms based on the boundary number," as transforming query to an

equivalence search using an inverted index generated, e.g., the exemplary query is

simple query having a single search condition. For two numbers N and M, their

tokens Ni and Mi, if N.M there exists, by definition, a token Nj which is greater than

Mj. In this case, the transformed query has an index entry that includes attribute,

token, list). The transformed query is based on number 10 (paragraph [0047, 0048,

0049], page 4, col. Right, lines 49-52),

"wherein a respective numerical index term in the expression includes

information indicative of an integral portion" as index term 01, 001, 0001 in table 1

includes a 1 bit in certain positions of the binary number indicates only numeric values

that are greater than 10 (paragraphs 0051, 0047, 0048). Each index entry includes each

token associated with an indexed number, e.g., token 0001 is associated with index 5 (page 4, col. Right, lines 49-52; fig. 5);

"an index searcher coupled to the query encoder configured to search a document index using the expression to identify one or more document containing numbers that satisfy the expression" as returning to the search condition, document Ids are retrieved from each matching token index which results in an ID list of all documents that match those tokens (paragraph [0052]),

" to return a result in accordance with at least a subset of the identified documents" as (paragraph 0052, page 20, col. Right).

Matsuda does not explicitly teach the claimed limitation "of a logarithm of the boundary number".

Burrows teaches [0319] The number of levels needed to encode a range of N integers, with doubling of sizes, is a function of log.sub.2 N, where N is the number of possible range-based integer values to be encoded.

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Burrows' s teaching to Matsuda's system in order to process a query having multiple ranges more efficiently and further eliminate processing time by eliminating unnecessary physical accesses of the data while executing of the query and further order to identify locations of the records including portions of numeric information within the span of the range of values.

As to claims 38, 42 and 46, Matsuda does not explicitly teach the claimed

limitation "wherein the respective numerical index term in the expression corresponds

to the position of the respective digit within the respective number".

Burrows teaches index terms that corresponding to the position of a digit of a

range number (fig. 7, col. 26, lines 1-30).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Burrows's teaching of index terms that

corresponding to the position of a digit of a range number to Matsuda's system in

order to identify locations of the records including portions of numeric information

within the span of the range of values.

As to claims 40, 44 and 48, Matsuda does not explicitly teach the claimed

limitation " wherein a respective numerical index term in the expression includes

information indicative of a mantissa of a respective number".

Burrows teaches index terms that corresponding to the position of a digit of a

range number (fig. 3, 7, col. 26, lines 1-30).

It would have been obvious to a person of an ordinary skill in the art at the time

the invention was made to apply Burrows's teaching of index terms that

corresponding to the position of a digit of a range number to Matsuda's system in

order to identify locations of the records including portions of numeric information

within the span of the range of values.

7. Claims 5, 17 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 20040243569) and further in view of Lewak et al (or hereinafter "Lewak") (US 6826566).

As to claims 5, 17 and 29, Matsuda does not explicitly teach the claimed limitation "wherein at least one numerical index term includes information indicative of a number type associated with a respective number range".

Lewak teaches value types includes numbers and dates (col. 12, lines 8-10).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Lewak's teaching of value types includes numbers and dates to Matsuda's system in order to allow a user to select a specific number type for searching so that the speed of query responses quickly.

8. Claims 37, 41, 45, 39, 43 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 20040243569) and further in view of Beavin et al (or hereinafter "Beavin") (US 6571233).

As to claims 37, 41 and 45, Matsuda does not explicitly teach the claimed limitation "wherein a respective numerical index term in the expression represents a respective digit of a respective number in base 10". Beavin teaches decimal number 270 refers to numbers in base 10 (col. 4, lines 62-65)

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Beavin's teaching of decimal number 270 refers to numbers in base 10 to Matsuda's system in order to improve a query optimization that is able to process query predicates with different data types for searching/.retrieving records in a large database.

As to claims 39, 43 and 47, Matsuda does not explicitly teach the claimed limitation "wherein the integral portion of the logarithm of a respective boundary number is an integral portion of a base 10 logarithm of the respective boundary number".

Burrows teaches index server (col. 3, lines 40-65; col. 4, lines 55-65). the range "57-70" can be converted to a Boolean search for the range-based metawords in the desired range. That is, search the word entries corresponding the subintervals whose concatenation exactly spans the range of the search term. If the selected metawords which exactly span the range are minimized, then the search time is also minimized since a minimum number of f index stream readers need to be used. The metawords which are to be used for scanning the index are selected from the "bottom" level up. For example, the metawords 57.sub.-- 1, 58.sub.-- 2, 60.sub.-- 3, 64.sub.-- 3, 68.sub.-- 2, and 70.sub.-- 1 exactly span the range "57-70" as shown by the cross hashing (col. 26, lines 1-25).

Beavin teaches decimal number 270 refers to numbers in base 10 (col. 4, lines 62-65)

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Burrows's teaching of index server and the range "57-70" can be converted to a Boolean search for the range-based metawords in the desired range. That is, search the word entries corresponding the subintervals whose concatenation exactly spans the range of the search term. If the selected metawords which exactly span the range are minimized, then the search time is also minimized since a minimum number of index stream readers need to be used. The metawords which are to be used for scanning the index are selected from the "bottom" level up. For example, the metawords 57.sub.-- 1, 58.sub.-- 2, 60.sub.-- 3, 64.sub.-- 3, 68.sub.-- 2, and 70.sub.-- 1 exactly span the range "57-70" as shown by the cross hashing to and Beavin's teaching of decimal number 270 refers to numbers in base 10 to Matsuda's system in order to improve a query optimization that is able to process query predicates with different data types for searching/.retrieving records in a large database, process a query having multiple ranges more efficiently, reduce processing time by eliminating unnecessary physical accesses of the data while executing of the query and further order to identify locations of the records including portions of numeric information within the span of the range of values.

9. Claims 37, 41, 45, 39, 43 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 20040243569) and further in view of Rajasekaran et al (or hereinafter "Rajasekaran") (US 7020782).

As to claims 37, 41 and 45, Matsuda does not explicitly teach the claimed limitation "wherein a respective numerical index term in the expression represents a respective digit of a respective number in base 10". Rajasekaran teaches representing each digit of a respective number in base 10 (col. 5, lines 35-55).

It would have been obvious to a person of an ordinary skill in the art at the time the invention was made to apply Rajasekaran teaches representing each digit of a respective number in base 10 to Matsuda's system in order to improve a query optimization that is able to process query predicates with different data types for searching/.retrieving records in a large database.

As to claims 39, 43 and 47, Matsuda does not explicitly teach the claimed limitation "wherein the integral portion of the logarithm of a respective boundary number is an integral portion of a base 10 logarithm of the respective boundary number".

Burrows teaches index server (col. 3, lines 40-65; col. 4, lines 55-65). the range "57-70" can be converted to a Boolean search for the range-based metawords in the desired range. That is, search the word entries corresponding the subintervals whose concatenation exactly spans the range of the search term. If the selected metawords which exactly span the range are minimized, then the search time is also minimized since a minimum number of f index stream readers need to be used. The metawords which are to be used for scanning the index are selected from the "bottom" level up. For example, the

metawords 57.sub.-- 1, 58.sub.-- 2, 60.sub.-- 3, 64.sub.-- 3, 68.sub.-- 2, and 70.sub.-- 1

exactly span the range "57-70" as shown by the cross hashing (col. 26, lines 1-25).

Rajasekaran teaches representing each digit of a respective number in base 10 (col.

5, lines 35-55).

It would have been obvious to a person of an ordinary skill in the art at the

time the invention was made to apply Burrows's teaching of index server and the

range "57-70" can be converted to a Boolean search for the range-based metawords

in the desired range. That is, search the word entries corresponding the

subintervals whose concatenation exactly spans the range of the search term. If the

selected metawords which exactly span the range are minimized, then the search

time is also minimized since a minimum number of index stream readers need to be

used. The metawords which are to be used for scanning the index are selected from

the "bottom" level up. For example, the metawords 57.sub.-- 1, 58.sub.-- 2, 60.sub.-

- 3, 64.sub.-- 3, 68.sub.-- 2, and 70.sub.-- 1 exactly span the range "57-70" and

Rajasekaran teaches representing each digit of a respective number in base 10 to

Matsuda's system in order to improve a query optimization that is able to process

query predicates with different data types for searching/.retrieving records in a large

database, process a query having multiple ranges more efficiently, reduce

processing time by eliminating unnecessary physical accesses of the data while

executing of the query and further order to identify locations of the records including

portions of numeric information within the span of the range of values.

Conclusion

10.   THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of

time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to
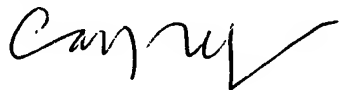
applicant's disclosure.

Ponte (US 7047242).

Contact Information

11.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cam Y T. Truong whose telephone number is (571) 272-4042. The examiner can normally be reached on Monday to Firday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cam Y Truong/

Primary Examiner, Art Unit 2162